



SCANIA

Industrial & Marine Engines

Edition 3

ECOM

Industrial & Marine Engines

User Manual



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Introduction

ECOM (Engine Communication) is a program which, together with the VCI (Vehicle Communication Interface) and USB key (Universal Serial Bus), enables communication between your PC and the control unit (EMS S6) on the engine.

You can carry out the following operations with ECOM:

- Read stored fault codes and 'Freeze Frames'. You can find out more about 'Freeze Frames' on page 10 point 6.
- Clear inactive fault codes
- Read information about stored working cycles
- Measure internal variables such as the engine speed, pressure, temperature and save them to a file
- Program certain parameters

The user manual is structured as follows.

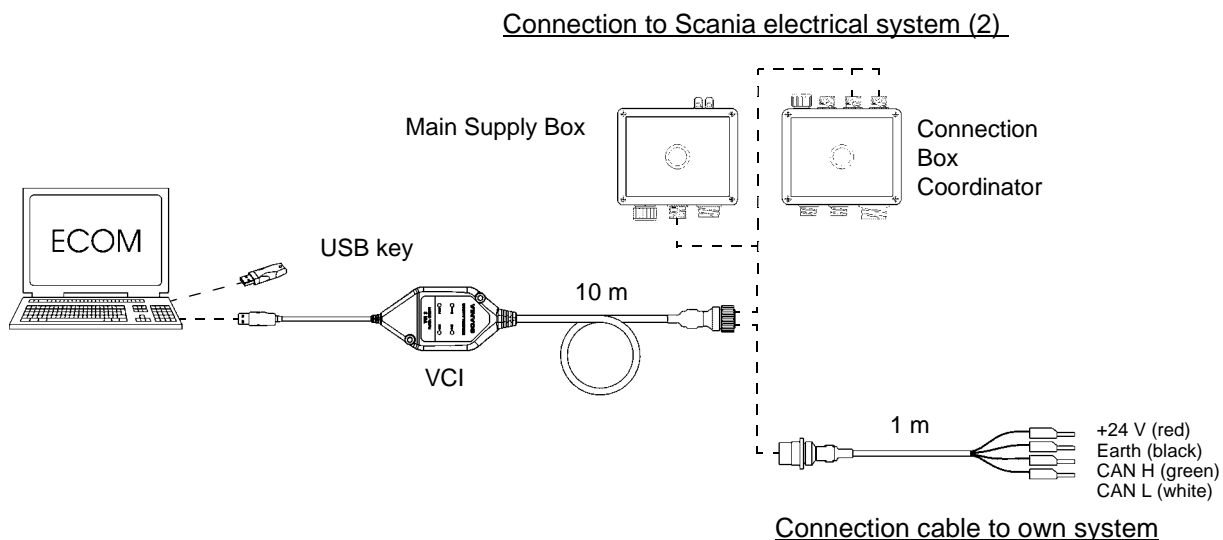
On pages 5 - 7 you will find an overview of the user interface with section numbers and page references. If you only wish to read one specific section, you just turn to the page indicated.

Certain functions in ECOM require real-time via CAN. The control unit (EMS S6) is not equipped with a real-time clock.

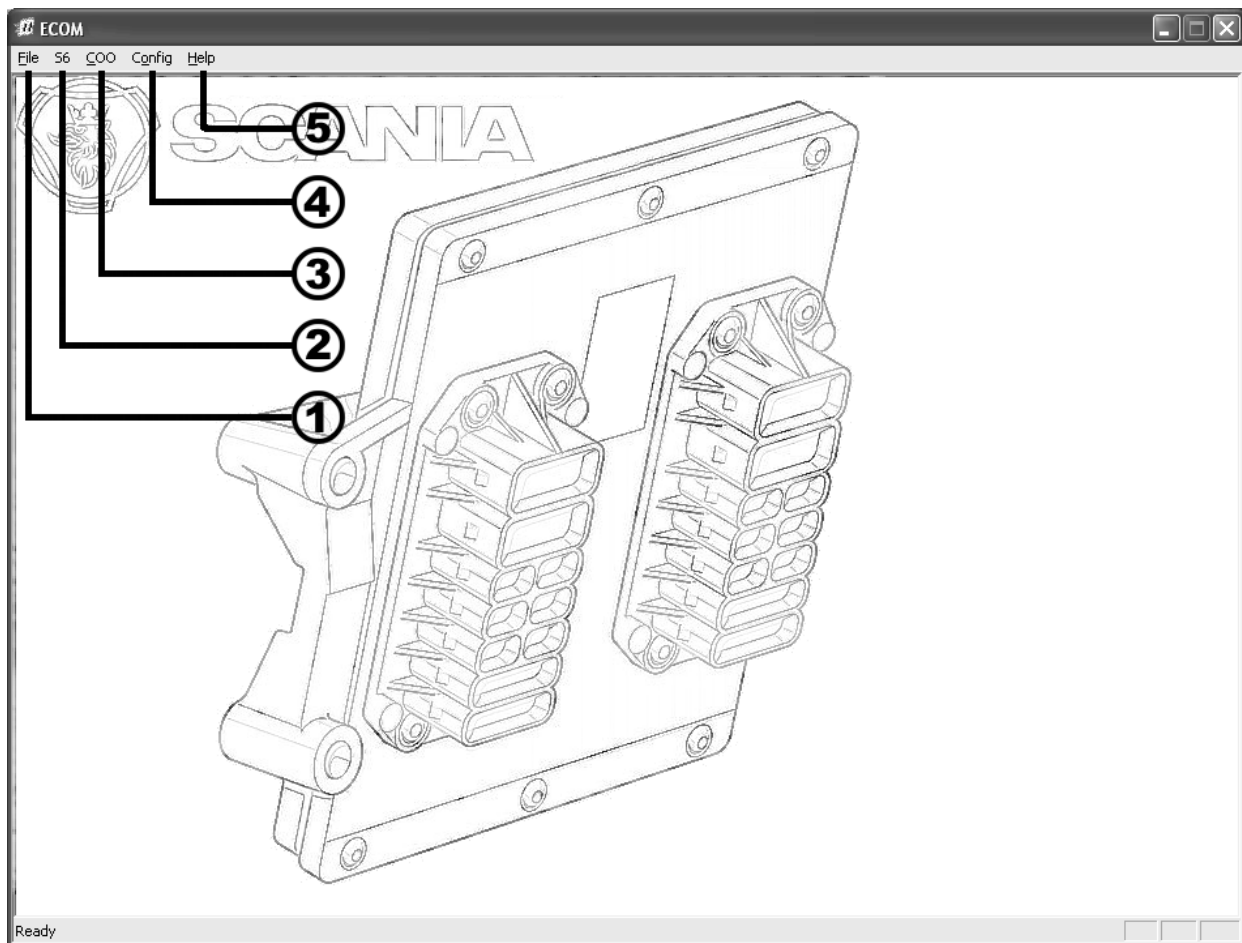
Lists of the variables and parameters which are available in ECOM are provided at the end of this manual.

Connection to CAN (Controller Area Network)

It is necessary to connect power (+24V) and CAN (high and low) to the VCI in order to use ECOM. This can be done in two different ways depending on whether you are using the Scania electrical system or your own. The illustration below shows the different connection options.



Overview of the user interface

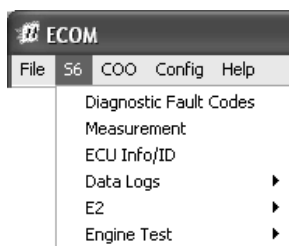


1. File



1.1 Exit, see page 8

2. S6



2.1 Diagnostic Fault Codes, see page 9

2.2 Measurement, see page 11

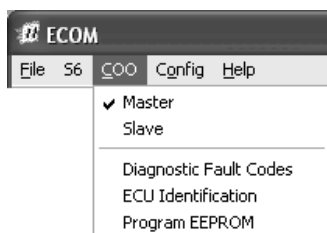
2.3 ECU info/ID, see page 16

2.4 Data logs, see page 17

2.5 E2, see page 23

2.6 Engine test, see page 27

3. COO



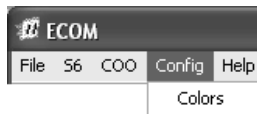
3.1 Master / Slave, see page 34

3.2 Diagnostic Fault Codes, see page 35

3.3 ECU Identification, see page 37

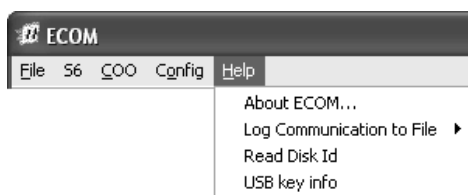
3.4 Program EEPROM, see page 38

4. Config



4.1 Colours, see page 40

5. Help



5.1 About ECOM..., see page 41

5.2 Log Communication to File, see page 41

5.3 Read Disk ID, see page 42

5.4 USB key info, see page 42

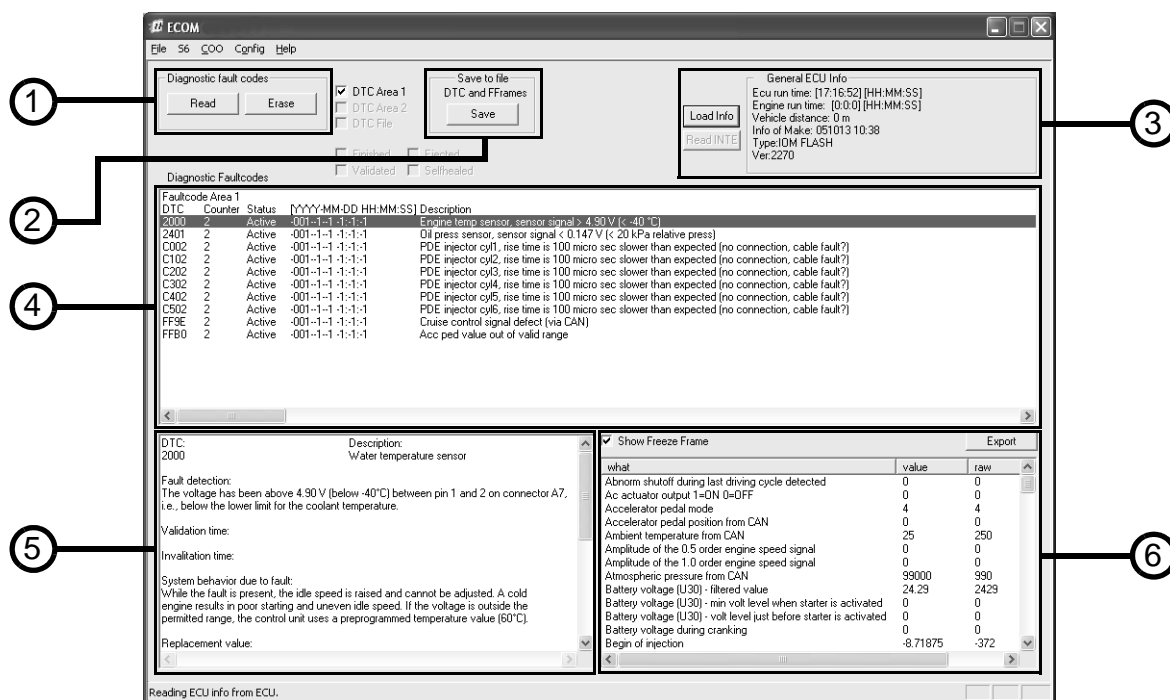
1. File

1.1 Exit

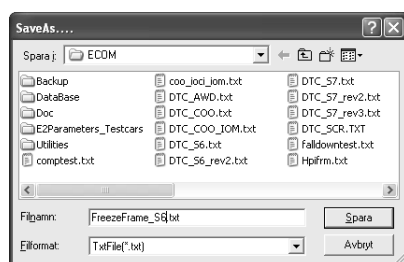
This option closes the ECOM program.

2. S6

2.1 Diagnostic Fault Codes



1. By pressing the 'Read' button, ECOM downloads all the stored fault codes from the fault code memory into the control unit. They are displayed in the field below (see point 4). 'Erase' is pressed to clear all inactive fault codes. Note that this only erases inactive fault codes. Active fault codes must be rectified before they can be erased.
2. If you click 'Save', ECOM will write all the current fault codes and all Freeze Frames (see point 6) to a text file. When ECOM has finished doing this, the program will ask where you wish to save the file (see illustration below). This function can be useful if you need to send information to a service engineer.



3. Press the 'Load Info' button to upload general information from the control unit to ECOM.
4. The fault codes which are stored in the control unit are displayed in the field 'Diagnostic Faultcodes'. The columns in the field are grouped as follows: DTC (Diagnostic Trouble Codes), Counter (Number of times the fault has occurred), Status (Active or passive), Date and time (requires real-time via CAN), Description of the fault code. By clicking on one of the fault codes a detailed description will be displayed in the field at the bottom (see point 5).

Diagnostic Faultcodes				
Fault code area 1	DTC	Counter	Status	Description
	2000	5	Active	[YYYY-MM-DD HH:MM:SS] Engine temp sensor, sensor signal > 4.90 V (< -40 °C)
	2001	1	Passive	Engine temp sensor, sensor signal < 0.440 V (> 130 °C)
	2101	2	Passive	Boost temp sensor, sensor signal < 0.440 V (> 130 °C)
	2200	2	Passive	Boost temp sensor, sensor signal > 4.66 V (> 400 kPa absolute press)
	2201	1	Passive	Boost press sensor, sensor signal < 0.500 V (< 50 kPa absolute press)
	2401	4	Active	Oil press sensor, sensor signal < 0.500 V (< 50 kPa relative press)

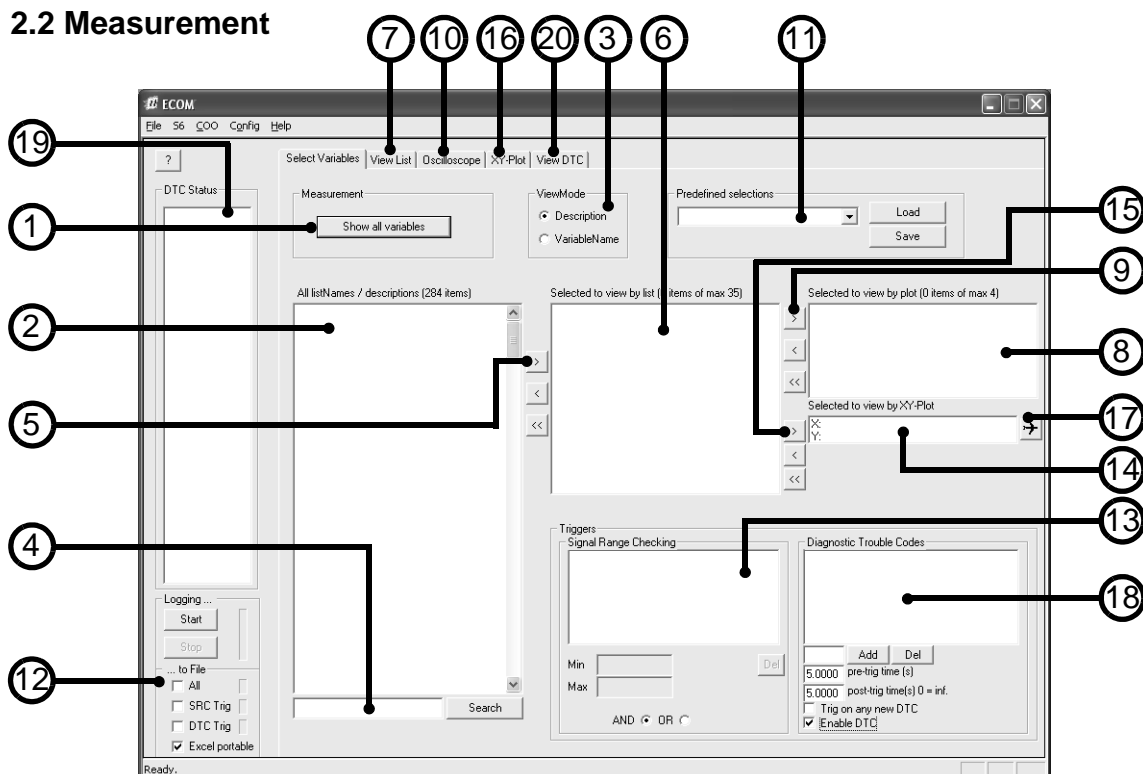
5. This field provides a detailed presentation of the fault code selected in the field above. It also shows how the system reacts to the fault and provides a brief troubleshooting procedure.

DTC:	Description:
2000	Water temperature sensor
Fault detection:	
The voltage has been above 4.90 V (below -40°C) between pin 1 and 2 on connector A7, i	
Validation time:	
Invalidation time:	
System behavior due to fault:	
While the fault is present, the idle speed is raised and cannot be adjusted. A cold engine re	
voltage is outside the permitted range, the control unit uses a preprogrammed temperature v	
Replacement value:	

6. If the option 'Show Freeze Frame' is selected, ECOM displays a 'Freeze Frame' for the selected fault code. A Freeze Frame is generated by the control unit at the moment a fault code occurs for the first time and it contains approximately 65 different variables and their values. This can be extremely useful for the service engineer who has to understand and resolve the problem. By clicking the 'Export' button, it is possible to save the displayed Freeze Frame as a text file. The file can then be opened, preferably in MS Excel.

Show Freeze Frame			
what	value	raw	unit
Abnorm shutoff during last driving cycle detected	0	0	-
A/c actuator output 1=ON 0=OFF	0	0	-
Accelerator pedal mode	2	2	-
Accelerator pedal position from CAN	0	0	%
Ambient temperature from CAN	25	250	Celsius
Amplitude of the 0.5 order engine speed signal	0	0	rpm/100
Amplitude of the 1.0 order engine speed signal	0	0	rpm/100
Atmospheric pressure from CAN	101300	1013	Pascal
Battery voltage (U30) - filtered value	24.53	2453	volt
Battery voltage (U30) - min volt level when starter is ac...	0	0	volt
Battery voltage (U30) - volt level just before starter is a...	0	0	volt
Battery voltage during cranking	0	0	volt

2.2 Measurement



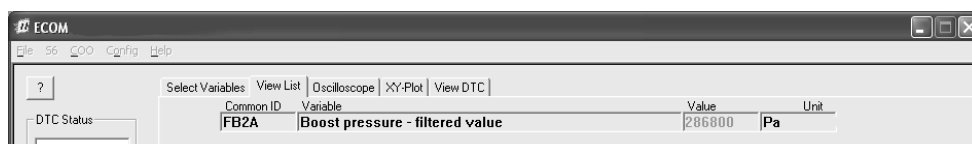
In the text below, references are made to points in the illustration above. For example: Click the button 'Show all variables' (see point 1). You will find usable measurement variables and examples on pages 43 and 44 respectively.

- A. The first thing to do when measuring variables is to retrieve these from the control unit. This is done by clicking on the button 'Show all variables' (see point 1). When the variables have finished loading, they are displayed in the field 'All list names / descriptions' (see point 2).

It is possible to display the variables according to their description or their variable name. This selection can be made in the 'ViewMode' field (see point 3).

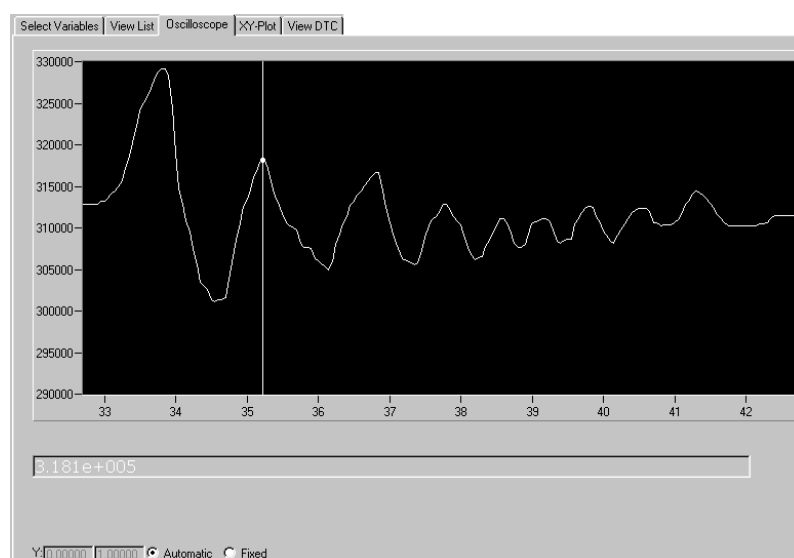
In addition, it is possible to make a selection from the variables list by searching on text. Enter the text you wish to search on, e.g.: pressure, beside the 'Search' button and then click the button (see point 4). The variables containing the text you have searched on are displayed in the field above (see point 2).

- B. The next step is to select the variables to be measured. Highlight the variable you wish to measure and then click the right arrow (see point 5). The variable then moves to the 'Selected to view by list' field (see point 6). The variables that you choose to place here are displayed with their respective values under the 'View List' tab (see point 7) when you start the measurement (see section F). You can place a maximum of 35 variables in this list.

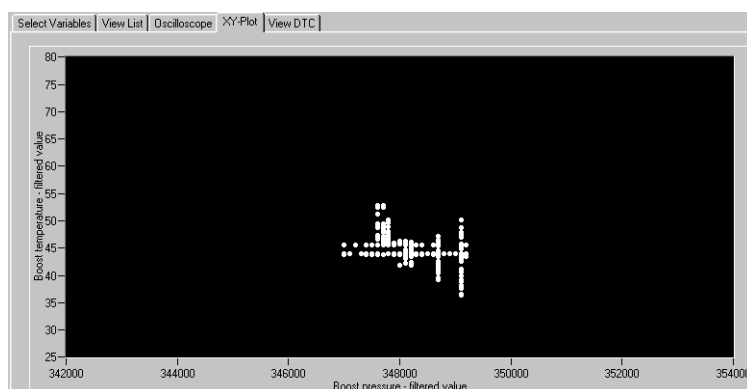


- C. If you wish to see a graph of the variables you have selected, transfer them to the 'Selected to view by plot' field (see point 8) by clicking on the right arrow to the right of the 'Selected to view by list' field (see point 9). You can place a maximum of 4 variables in this list. Note that you cannot move variables directly to this field. The variables that you choose to place here are displayed graphically under the 'Oscilloscope' tab (see point 10) when you start the measurement (see section F).

Before you start the measurement, you can choose whether to have an automatically adjusted or manually fixed scale. This is done at the bottom of the window. When the measurement has stopped, a marker can be moved along the curve to see the current value after a certain time in seconds. The marker is moved by holding the left mouse button down at the same time as dragging the mouse along the curve. The value is displayed in the list below.



- D. It is also possible, if required, to see a plot of the variables placed in the 'Selected to view by XY-Plot' field (see point 14). The variables are moved by clicking the right arrow at the bottom right of the 'Selected to view by list' field (see point 15). You can place a maximum of 2 variables in this list. These will be displayed graphically in correlation to each other under the 'XY-Plot' tab (see point 16). The variables are displayed on the X or Y axis, depending on what you select. You change the variable axis by clicking on the arrow beside the 'Selected to view by XY-Plot' field (see point 17). The axes can have an automatically adjusted or manually fixed scale. Note that you cannot move variables directly to this field.

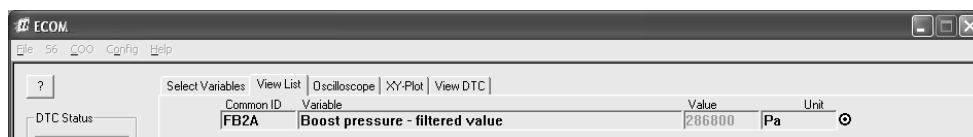


- E. If you frequently measure the same variables, after making your selection as above, you can save this selection by clicking the 'Save' button in the 'Predefined selections' field (see point 11). Enter a name for your list and click 'OK'. When you wish to retrieve a saved list, first select the list you require in the menu and then click the 'Load' button.
- F. To start measuring the variables you have selected, click the 'Start' button in the 'Logging' field (see point 12). You can now go to the relevant tab for list or graph to see the current values. When you have finished measuring, click the 'Stop' button. If you decided to use the 'XY-Plot' function, you will be asked whether you wish to save the result as an image file. You can also save your measurements to a text file, only measure within defined ranges of the values of variables or measure when a fault code occurs. This is described in sections G and H.

- G. To save your measurements to a text file, select 'All' in the 'Logging' field (see point 12). If you wish to have the option to copy the contents in the text file to the program Microsoft Excel you should also select 'Excel portable' in the same field. When you start the measurement, you must indicate where you wish to save the file and state its name.


If the program is only required to record when the value of the variable is within a defined range, you should proceed as follows. Select 'SRC Trig' in the 'Logging' field (see point 12). Highlight the variable for which you wish to indicate the range in the 'Selected to view by list' or 'Selected to view by plot' field (see points 6 and 8). Then indicate the limits (Min - Max) you require in the 'Triggers' field (see point 13). Now the program will only save the values which are within these limits to the text file.
















You can also see when a variable is within the specified range under the 'View List' tab (see point 7), where it is highlighted by a solid circle. If the variable is outside the specified range, the circle is empty.



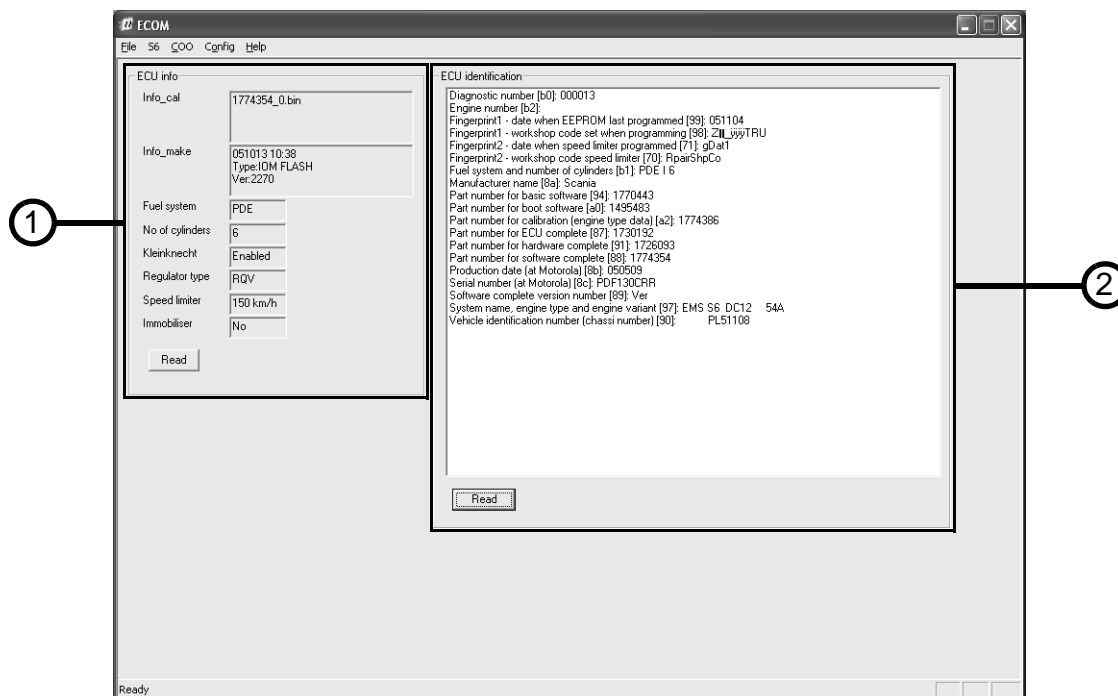
- H. Another function which can be used is 'Diagnostic Trouble Codes' (see point 18). ECOM can be used here to start measuring when a fault code is generated in the control unit. The function is activated by selecting 'Enable DTC'. To save your measurement to a text file, select 'DTC Trig' in the 'Logging' field (see point 12).

It is possible to arrange for the measurement to start when a fault code of any kind is generated by selecting 'Trig on any new DTC'. If, however, you wish to specify one or more specific fault codes, enter these beside the 'Add' button and then click 'Add'. The fault code will then appear in the large field above. You can also set the point at which ECOM should start measuring before a fault code is generated. This is done by entering the number of seconds in the 'pre-trig time' field. Similarly, you can also set the length of time which should be measured after a code has been generated in the 'post-trig time' field (0=infinite).

If you select this function the fault code status will be displayed in the 'DTC Status' field (see point 19). If a fault code is active, this symbol is displayed before the fault code, . Information about the fault codes can also be obtained under the 'View DTC' tab (see point 20).

Select Variables View List Oscilloscope XY-Plot View DTC									
Id	Active	Historic	Storage St...	Test Ready	Inhibit	Running	Pending St...	Pending	Count
 ffb1	Active	Current	True	False	False	False	False	False	2
 c502	Passive	Historic	True	False	False	False	False	False	1
 c500	Active	Current	True	False	False	False	False	False	1
 c402	Passive	Historic	True	False	False	False	False	False	1
 c400	Active	Current	True	False	False	False	False	False	1
 c302	Passive	Historic	True	False	False	False	False	False	1
 c300	Active	Current	True	False	False	False	False	False	1
 c202	Active	Current	True	False	False	False	False	False	2
 c102	Active	Current	True	False	False	False	False	False	2
 c002	Active	Current	True	False	False	False	False	False	2
 4410	Active	Current	True	False	False	False	False	False	2
 3303	Active	Current	True	False	False	False	False	False	2
 3300	Active	Current	True	False	False	False	False	False	2
 2401	Active	Current	True	False	False	False	False	False	2
 2000	Active	Current	True	False	False	False	False	False	2

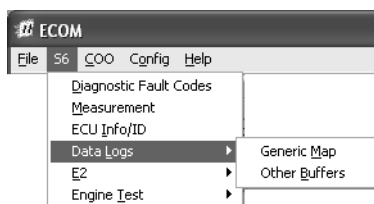
2.3 ECU info/ID



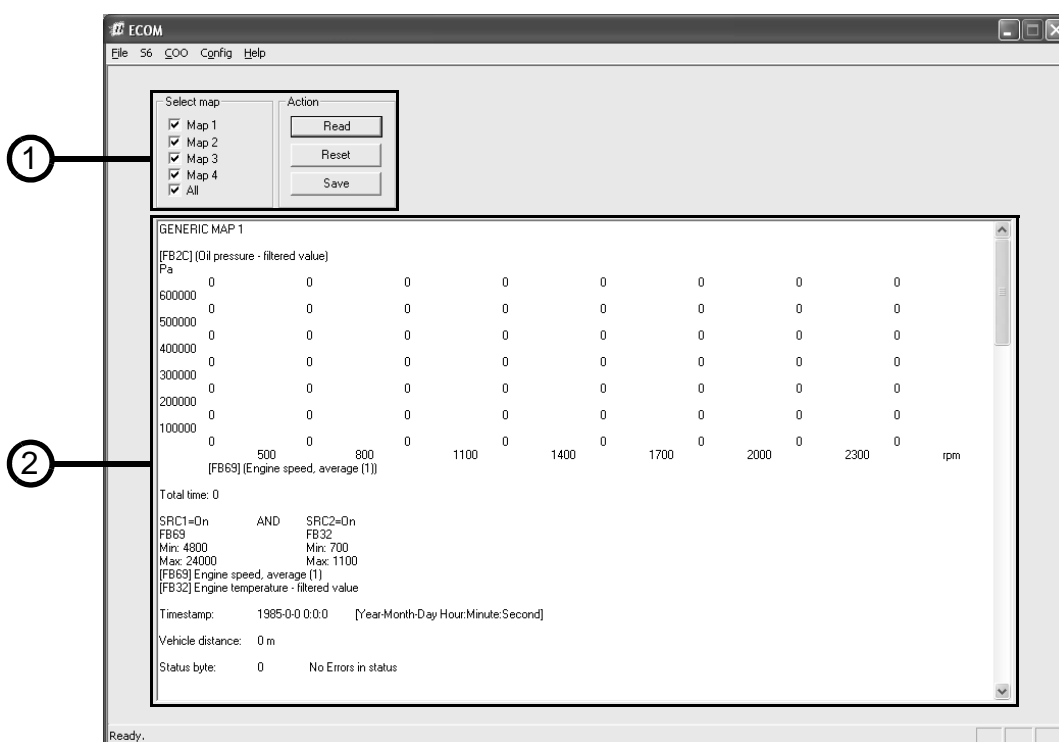
This option displays general information about the control unit and identification parameters in the control unit.

1. Click the 'Read' button to load general information from the control unit. The information which is displayed is as follows:
 - Calibration of the control unit
 - Control unit version
 - Fuel system
 - Number of cylinders
 - Kleinknecht, (trucks only)
 - Type of governor
 - Speed limitation, (trucks only)
 - Immobiliser, (trucks only)
2. Click the 'Read' button to load identification parameters from the control unit. These contain, for example, information about the engine number, date of manufacture and engine type.

2.4 Data logs



2.4.1 Generic map

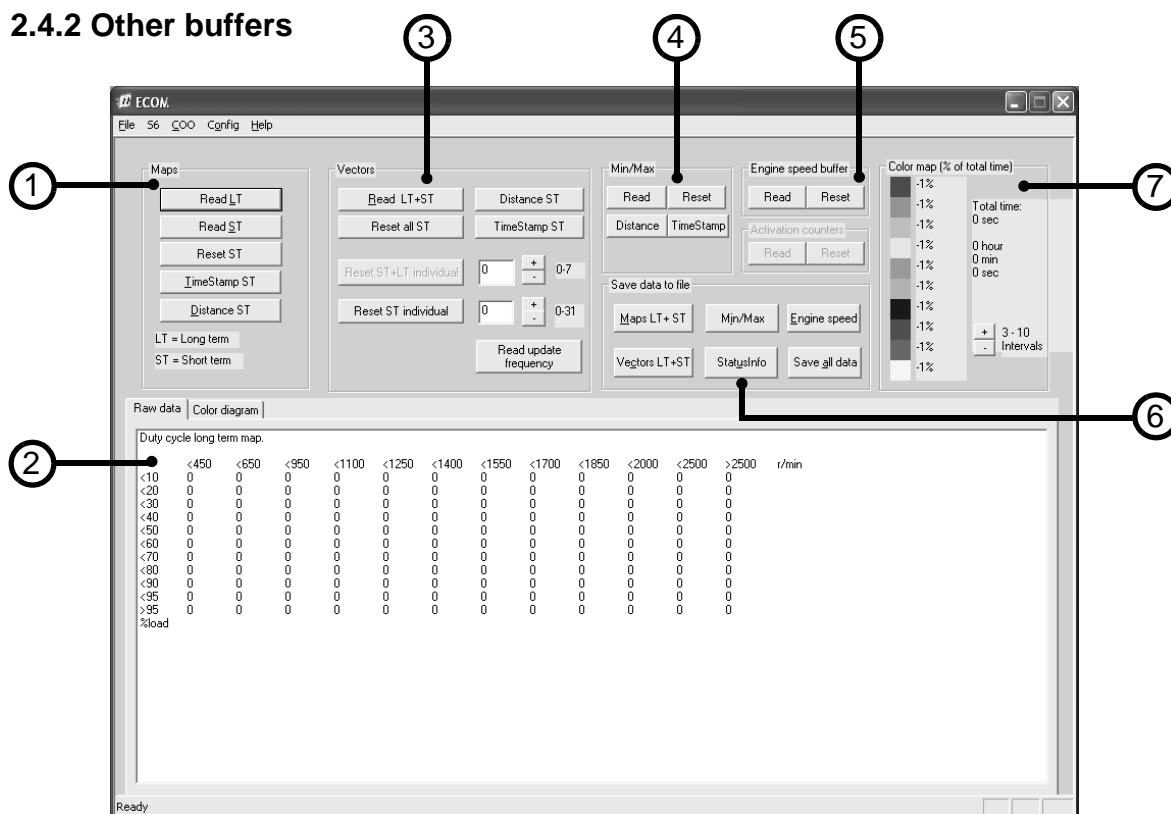


This option displays the generic maps (map 1, 2, 3, 4) which the control unit stores. 'Map 1' is the only map providing information which is applicable to Scania industrial and marine engines (oil pressure as a function of the engine speed).

1. In this field you can select which maps you wish to use. When you have made your selection, press the appropriate button ('Read', 'Reset' or 'Save'). 'Read' loads data from the control unit and displays it in the field below (see section 2). 'Reset' resets the map which is selected and 'Save' saves the highlighted selections to a text file.

2. The selected maps are displayed in this field when you press the 'Read' button. They are displayed as a biaxial matrix, in which the axes display the values for the pre-programmed parameters.

2.4.2 Other buffers



Information about how the engine has been used can be read here in three different ways. Each second information is stored about the engine working cycle and it can be displayed as a map of the working cycle, as vectors of the variable values and as min/max values.

In the text below, references are made to points in the illustration above. For example: Click the button 'Read LT' (see point 1).

- A. You can use the buttons in the 'Maps' field to view maps of the engine working cycle (see point 1). Information can be obtained from a long-term map or a resettable short-term map. The long-term map contains information from the point at which the engine was started for the first time. Both are displayed as a biaxial matrix with engine speed on one axis, and load in percent on the other.

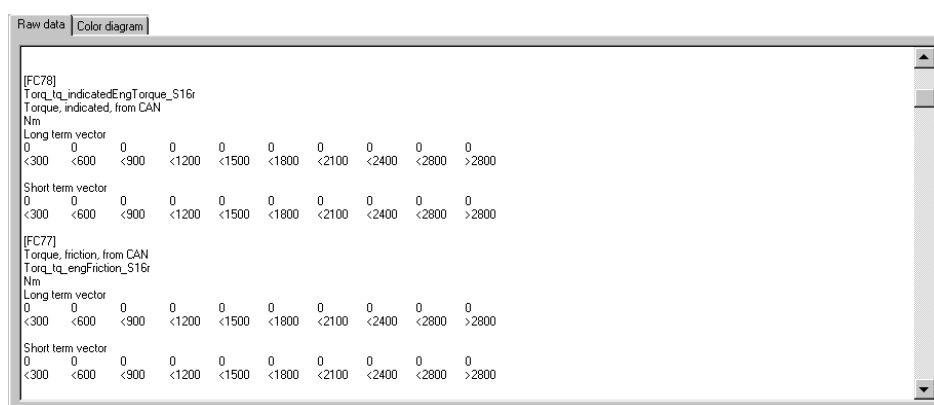
The 'Read LT' button displays the long-term map and the 'Read ST' button displays the short-term map. They are displayed in the field below (see point 2). The other buttons are used as follows: 'Reset ST' resets the short-term map, 'TimeStamp ST' can be used to view when the latest map was reset (requires real-time via CAN), 'Distance ST' applies only to trucks. Information can also be displayed graphically under the 'Color diagram' tab (see section F).

- B. Information for vectors of variable values is controlled in the 'Vectors' field (see point 3). 32 variable values are stored in the control unit, as both long-term and short-term values. The long-term values are stored from the point at which the engine was started for the first time, whereas the short-term values can be reset.

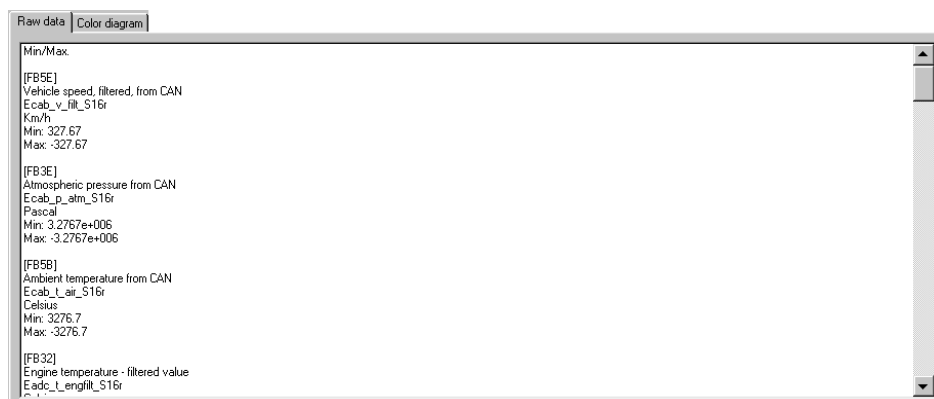
Click the 'Read LT + ST' button to display the information in the field below (see point 2). The information is displayed as the number of seconds for which the value has been between two breakpoints.

Short-term values can be reset in two different ways. Each value can be reset individually by selecting the number of the value and then pressing the 'Reset ST individual' button. If you wish to reset all the values, press the 'Reset all ST' button.

Other buttons are as follows: 'Distance ST' applies only to trucks, 'TimeStamp ST' can be used to view when the short-term values were last reset (requires real-time via CAN), 'Read update frequency' is used to view the updating frequency for the control unit.

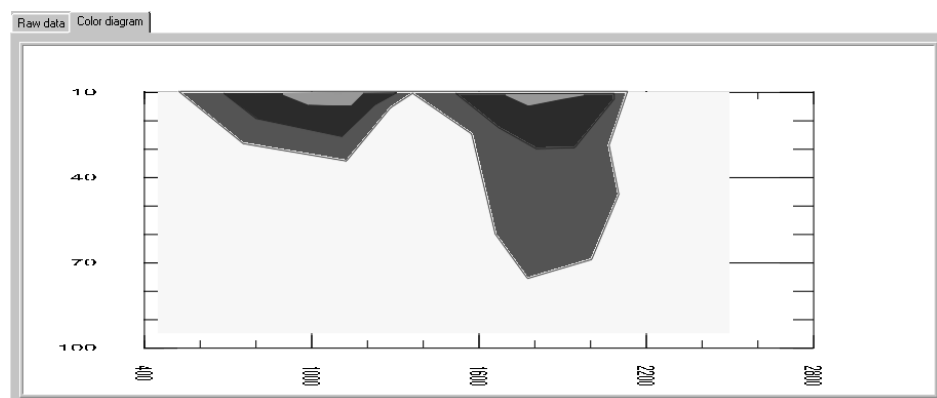


- C. Minimum and maximum information is controlled in the 'Min/Max' field (see point 4). The minimum and maximum values for 32 variables are stored in the control unit and displayed by clicking the 'Read' button. The values can be reset by clicking the 'Reset' button. The other buttons are used as follows: 'Distance' applies only to trucks, 'TimeStamp' can be used to view when the minimum and maximum values were last reset (requires real-time via CAN).

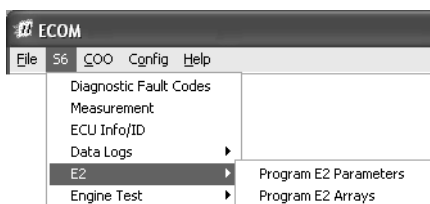


- D. 'Engine speed buffer' (see point 5) is a function for engine speed statistics. This information can be useful when contacting a service engineer.
- E. There are a number of buttons in the 'Save data to file' field (see point 6) which can be used to save information to a text file. Press the button for the save process you wish to carry out.

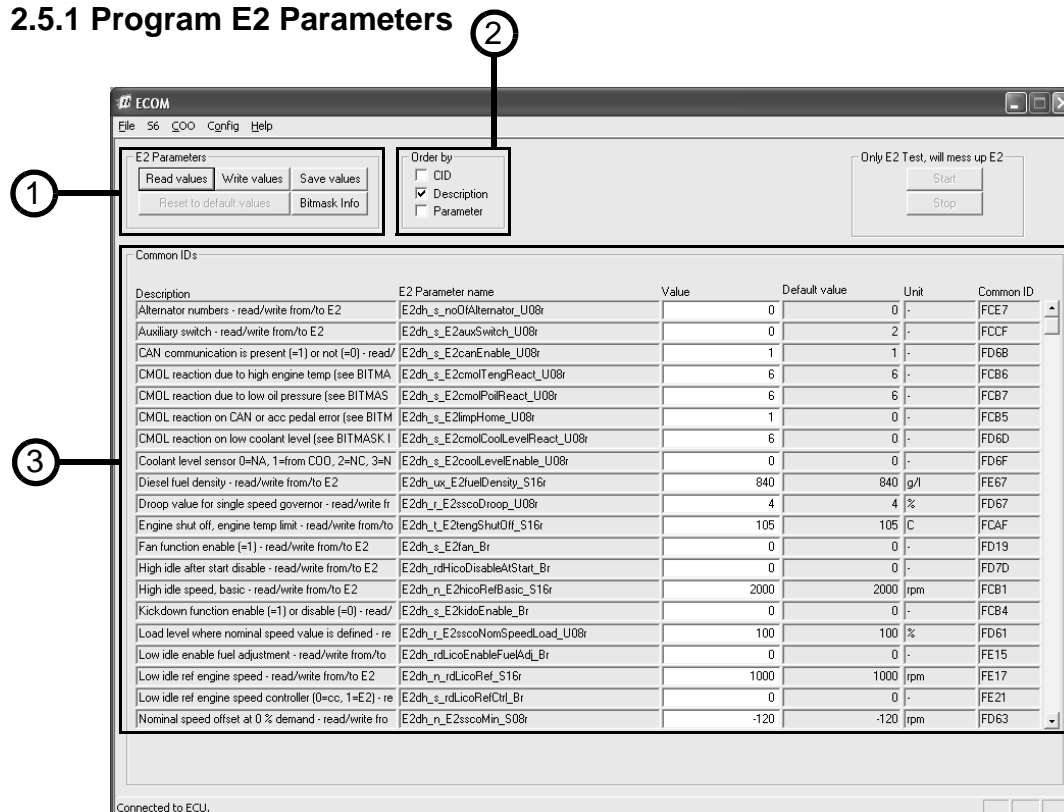
- F. In the 'Color map' field (see point 7), it is possible to change the number of colours which depict the values displayed graphically by clicking the '+' and '-' buttons. The values are displayed graphically as a percentage of the total time under the 'Color diagram' tab. The more colours that are used, the shorter the interval that can be read in the graphic display.



2.5 E2



2.5.1 Program E2 Parameters



The parameters in the control unit which are available to the aftermarket can be reprogrammed here. A list of the parameters can be found on page 45.

1. By pressing the 'Read values' button, the parameters which can be amended in the control unit are loaded. They are displayed in the 'Common IDs' field below (see point 3).

When you have finished making changes, click the 'Write values' button. ECOM then writes the new values to the control unit. After completing the programming, an information box displays what has been programmed.

The 'Save values' button saves all the parameters and their values to a text file.

'Bitmask Info' is a help function which contains information about different values and their significance for certain parameters (see illustration below). You can also find information about the meaning of the values under 'Alarm / Error reactions' on page 46.

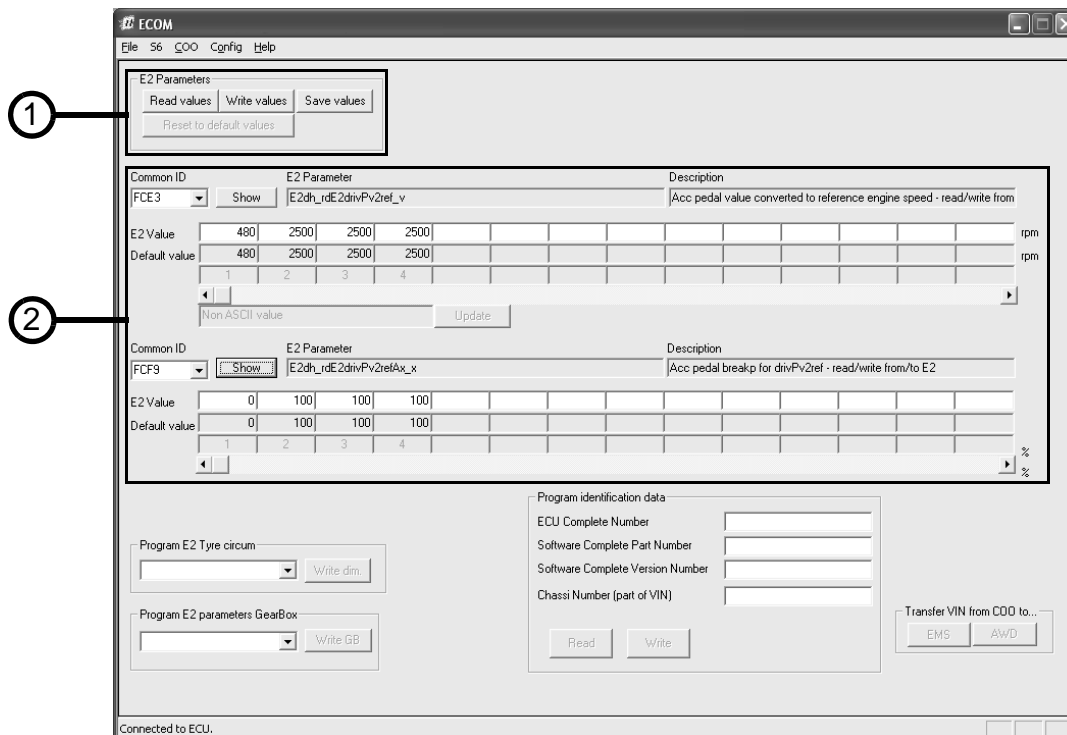


- In the 'Order by' field, it is possible to sort the parameters which are displayed in the 'Common IDs' field in alphabetical order in three different ways. According to Common ID, parameter description or parameter name.
- Parameters which can be changed on the aftermarket are displayed in the 'Common IDs' field. They are described in columns as follows. Description (description of the parameter in plain text), E2 parameter name (parameter name in the software), Value (current value), Default value (value loaded into the control unit memory if there is a fault), Unit (unit in which the parameter is measured), Common ID (hexadecimal ID number).

If you wish to change a value in the control unit, enter it in the Value column and then click the 'Write values' button (see point 1).

Common IDs					
Description	E2 Parameter name	Value	Default value	Unit	Common ID
A/c function enable (=1) - read/write from/to E2	E2dh_s_E2ac_Br	0	0		FD17
Alternator numbers - read/write from/to E2	E2dh_s_noOfAlternator_U08r	0	0		FCE7
Auxiliary switch - read/write from/to E2	E2dh_s_E2auxSwitch_U08r	0	0		FCCF
Axle gear ratio - read/write from/to E2	E2dh_t_axleGearRatio_S16r	3.4	3.4		FCE9

2.5.2 Program E2 Arrays



1

2

This function handles the programming of parameters consisting of several parts. It may, for example, be a torque curve in which each part which can be programmed corresponds to a specific engine speed. For information about what can be programmed, please refer to the Parameters (Arrays) list on page 48.

1. By pressing the 'Read values' button, the Common IDs which can be amended in the control unit are loaded. They are displayed in the 'Common ID' field below (see point 2).

When you have finished making changes, click the 'Write values' button. First an information box will display which Common ID has been programmed and its values. ECOM then writes the new values to the control unit. After completing the programming, an information box displays whether the programming was successful.

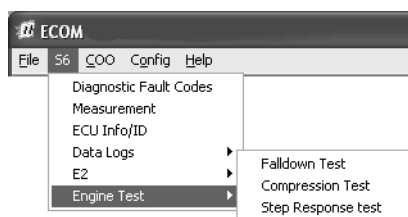
The 'Save values' button saves all the parameters and their values to a text file.

2. Two different Common IDs can be programmed at the same time and there are therefore two fields for them here. It may sometimes be necessary to view one Common ID in order to determine what should be programmed into the other one.

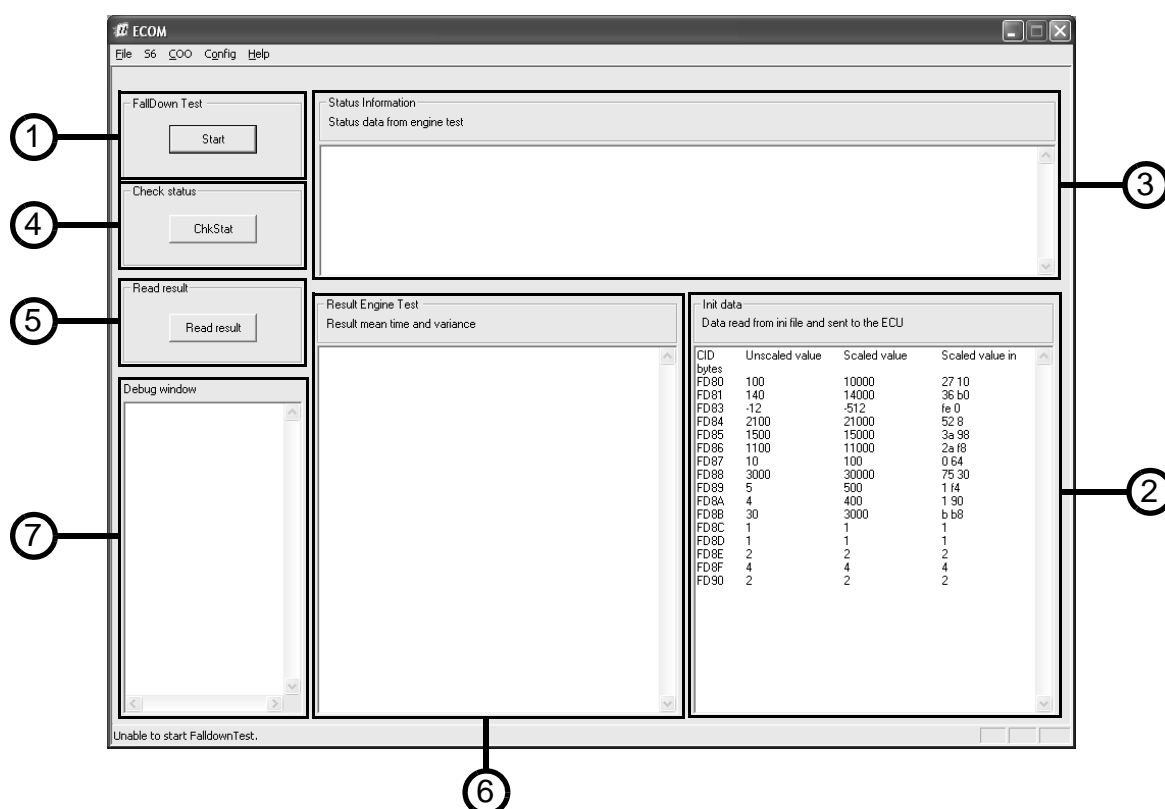
Select Common ID in the list and then click the 'Show' button to display the current values in the 'E2 Value' line. You can see the parts (bytes) which the Common ID consists of in the bottom line. The middle 'Default Value' line describes the base values, if applicable, for each part. At the right-hand edge of the field you can see the unit in which the Common ID you have selected is described.

You can change the values in the top 'E2 Value' line and then click the 'Write values' button (see point 1).

2.6 Engine test



2.6.1 Falldown Test

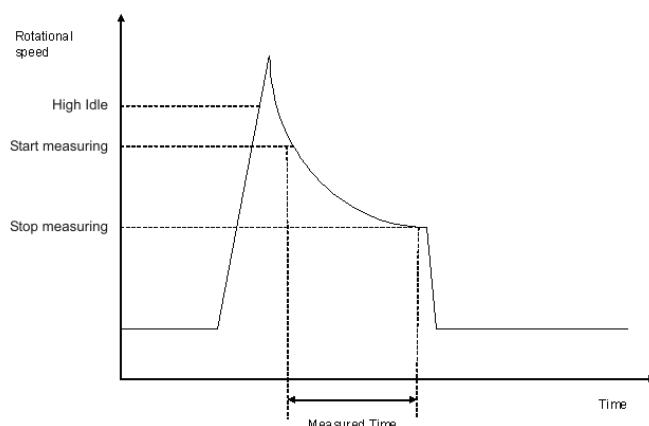


IMPORTANT! This test should only be carried out along with a Scania service engineer.

The aim of this test is to assess the condition of each cylinder in the engine. The engine must be synchronised before the test begins, which means that the engine must be idling when the test begins. Preferably, the engine should also have reached a temperature of 75-85 °C.

The test is carried out by first revving up the engine to a given speed. When the engine speed has been reached, the fuel supply is shut off to all cylinders apart from the cylinder whose condition is to be tested. A specified amount of fuel is supplied to this cylinder.

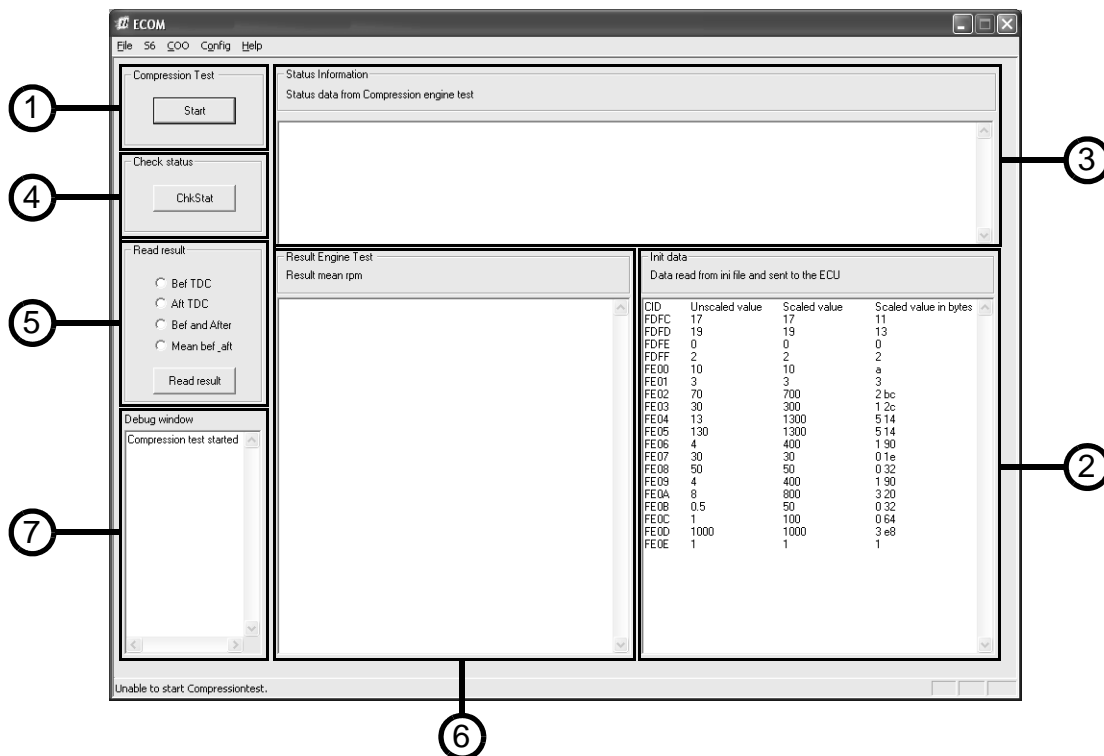
The engine speed will fall because the engine power has been reduced substantially. The rate of engine speed retardation reflects the output of the engine (in other words, the output from the single cylinder receiving fuel). The retardation is measured by measuring the time it takes the engine to fall between two specified engine speeds (see illustration below).



This procedure is repeated a number of times for each cylinder in the engine. This provides an average falldown time value for each cylinder, a value which can be used to compare the different cylinders. A well-functioning engine should have the same falldown time for all cylinders. Note that a variation of $\pm 3\%$ is not abnormal for this test.

1. Click the 'Start' button to start the test.
2. When you start the test, the parameters in the 'Init data' field are transmitted to the control unit. The control unit then carries out the test in accordance with these parameters.
3. Information about the status of the current test is displayed here.
4. Click the 'ChkStat' button after completing the test to display the test status (see point 3).
5. When the test has finished, click the 'Read result' button to display the test result (see point 6).
6. The test result is displayed in the 'Result Engine Test' field.
7. Internal test variables are displayed in the 'Debug window' field.

2.6.2 Compression Test



IMPORTANT! This test should only be carried out along with a Scania service engineer.

IMPORTANT! This test can only be carried out if the starter motor is controlled via the control unit.

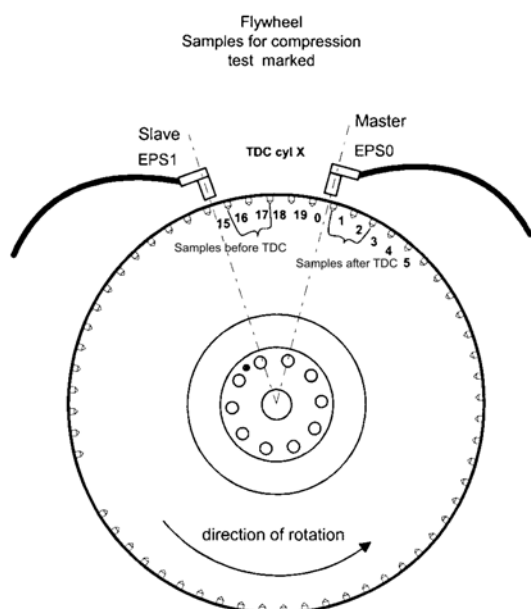
IMPORTANT! You must consult the conversion table on page 31 to read out the correct result of the test.

The test can be used to see if any cylinder deviates from the other cylinders in the engine. If possible, the test should be carried out when the engine has a normal working temperature.

The engine must be synchronised before the test begins, which means that the engine must be idling when the test begins. When the above conditions are fulfilled, the engine will be stopped. The starter motor will then crank the engine for a given number of revolutions and at the same time measure the average angular speed within a specific angular range before and after top dead centre (TDC). The torque load on the starter motor will vary according to the compression in each cylinder, and thus the angular speed on the crankshaft will also vary.

The result is displayed as times for each cylinder. The times can then be compared with one another to see if any cylinder deviates from the others. Note that a variation of +/- 2% is not abnormal for this test.

1. Click the 'Start' button to start the test.
2. When you start the test, the parameters in the 'Init data' field are transmitted to the control unit. The control unit then carries out the test in accordance with these parameters.
3. Information about the status of the current test is displayed here.
4. Click the 'ChkStat' button after completing the test to display the test status (see point 3).
5. When the test is finished, select one of the options (see illustration below), 'Bef TDC', 'Aft TDC', 'Bef and After', 'Mean bef_aft', and then click the 'Read result' button to display the test result (see point 6).



6. The test result is displayed in the 'Result Engine Test' field.
7. Internal test variables are displayed in the 'Debug window' field.

Conversion table

There is a mismatch between the cylinder numbers presented in the 'Result Engine Test' field (see point 6), and the real cylinder number. Please consult the conversion table below to read out the correct result. The conversion table is applicable on the following softwares:

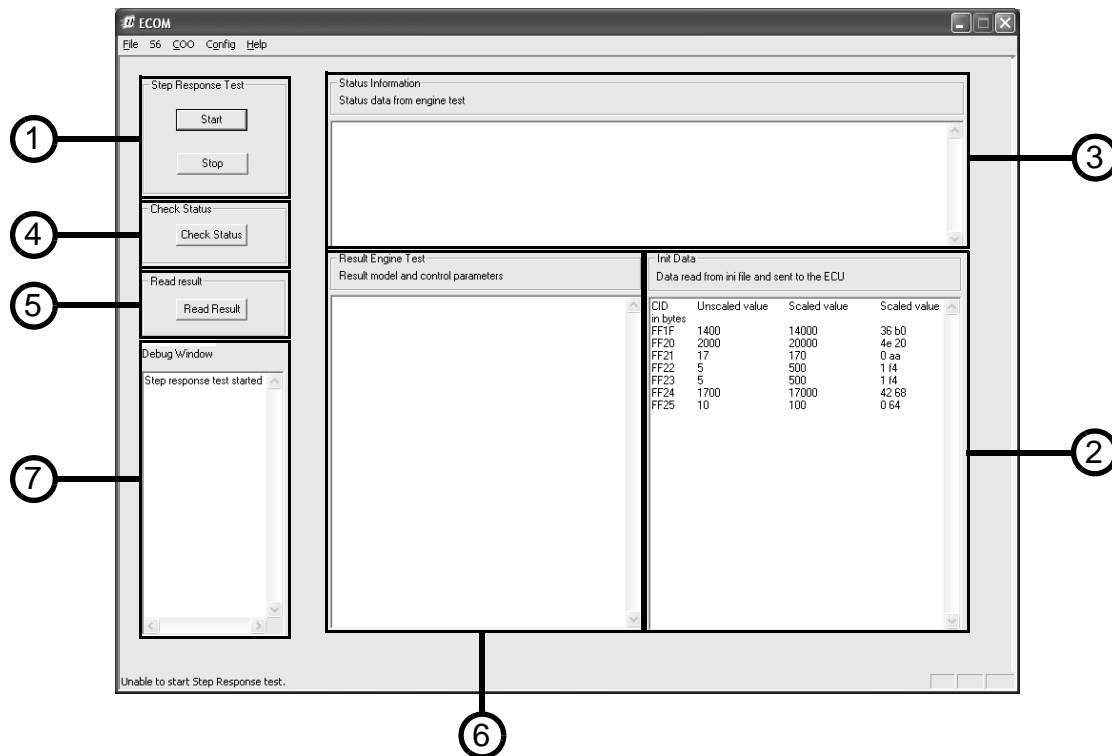
Software table

Basic Software	Version
1505539	2242
1528920	2253
1545105	2254
1721428	2262
1770443	2270, 2271

Conversion table

Cylinder number in result window	Real cylinder number		
	8-cylinder engine	6-cylinder engine (no mismatch)	5-cylinder engine
1	1	1	1
2	6	2	2
3	2	3	5
4	5	4	3
5	3	5	4
6	4	6	-
7	7	-	-
8	8	-	-

2.6.3 Step Response Test



IMPORTANT! This test should only be carried out along with a Scania service engineer.

IMPORTANT! This test is only valid for single speed engines and works only in software version 2270 or later.

The aim of this step response test is to tune the engine speed regulator using the result of this test in the Engine Control Unit parameters. It's useful if none of the three factory presets (normal/soft/stiff) are suitable for a specific installation.

For the test to be carried out successfully there is some conditions that has to be fulfilled:

- No active fault codes
- Unloaded engine
- Normal oil pressure
- Normal working temperature
- The engine has been synchronized at start

If any of these conditions is unfulfilled during the test, the test will be cancelled.

Also, the Common ID FE69 (overspeed protection) should be changed to 40% to avoid conflicts in RPM during the test. Don't forget to change this back after testing is finished.

The test is carried out by first revving up the engine to a given speed. When the engine speed is stable, a small rise in the fuel amount is made. The engine speed rises slowly and stabilizes at a new, higher, level.

This procedure is repeated three times. Data from the test is then used to calculate two new sets of regulator parameters which can be selected in the Common ID FCFD (see page 46).



1. Click the 'Start' button to start the test. The 'Stop' button is used to cancel the test. The test will also be cancelled if the ignition key is turned off.
2. When you start the test, the parameters in the 'Init data' field are transmitted to the control unit. The control unit then carries out the test in accordance with these parameters.
3. Information about the status of the current test is displayed here.
4. Click the 'ChkStat' button to display the test status (see point 3).
5. When the test is finished, click the 'Read result' button. The test result is shown in the 'Result Engine Test' field (see point 6). Also, two sets of parameters are calculated and can be used by setting the Common ID FCFD to value 10 or 11 (10=first set, 11=second set).
6. The test result is displayed in the 'Result Engine Test' field.
7. Internal test variables are displayed in the 'Debug window' field.

3. COO

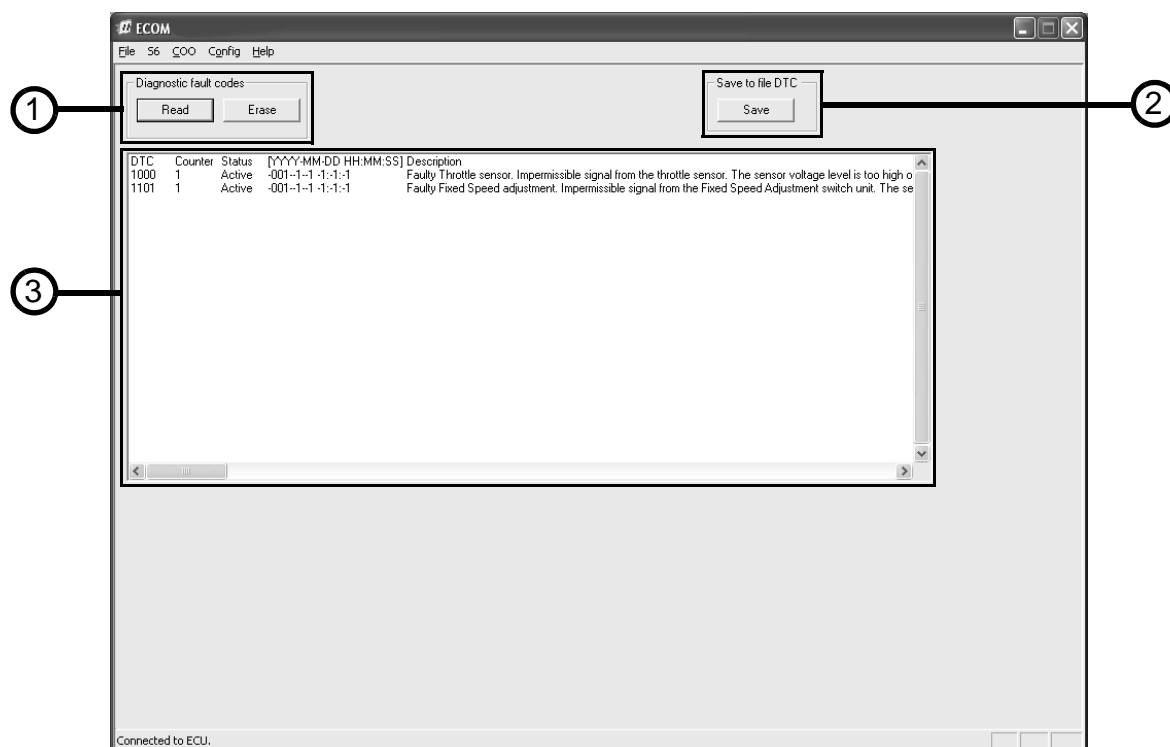
3.1 Master / Slave



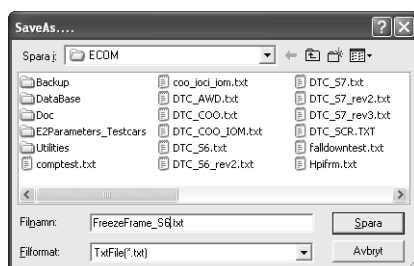
This function can only be used when there are two coordinators in the same CAN communication (e.g. via double instrumentation in a boat).

1. Opt for ECOM to read/write from the coordinator which is programmed as the 'Master' in the control unit. 'Master' is selected as standard when ECOM is started.
2. Opt for ECOM to read/write from the coordinator which is programmed as the 'Slave' in the control unit.

3.2 Diagnostic Fault Codes



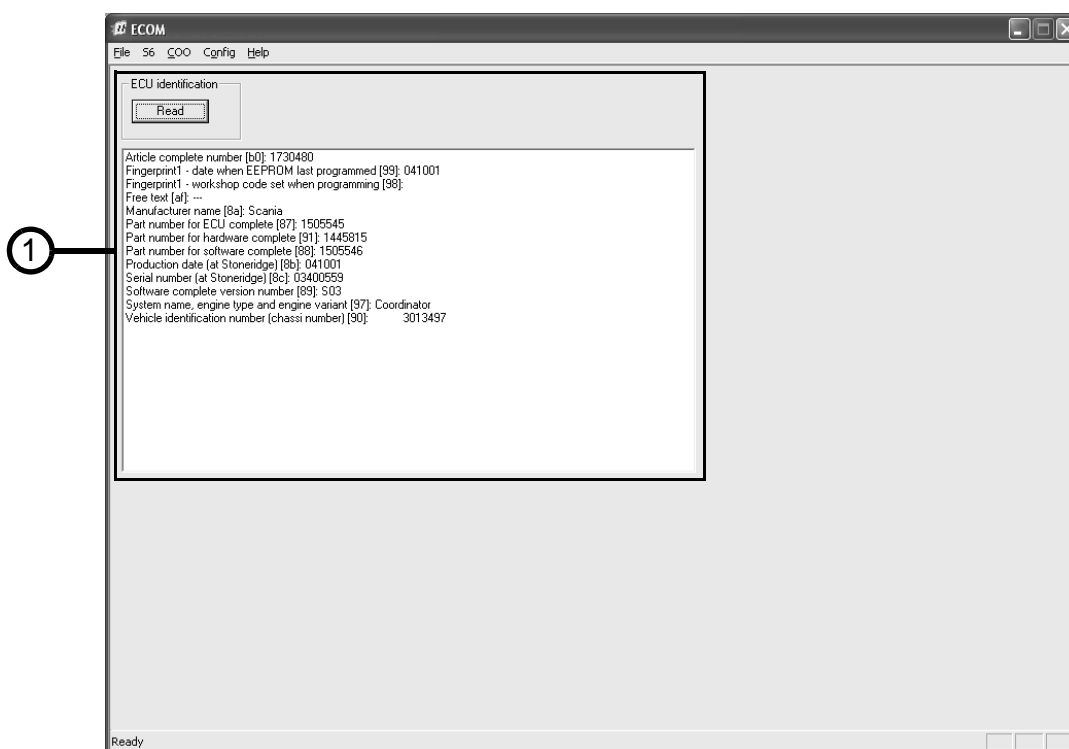
1. By pressing the 'Read' button, ECOM downloads all the stored fault codes from the coordinator. They are displayed in the field below (see point 3). 'Erase' is pressed to clear all inactive fault codes. Note that this only erases inactive fault codes. Active fault codes must be rectified before they can be erased.
2. If you click 'Save', ECOM will write all the current fault codes to a text file. When ECOM has finished doing this, the program will ask where you wish to save the file (see illustration below). This function can be useful if you need to send information to a service engineer.



- The fault codes which are stored in the coordinator are displayed in this field. The columns in the field are grouped as follows: DTC (Diagnostic Trouble Codes), Counter (Number of times the fault has occurred), Status (Active or passive), Date and time (requires real-time via CAN), Description of the fault code.

DTC	Counter	Status	[YYYY-MM-DD HH:MM:SS]	Description
1000	1	Active	-001-1-1-1-1-1-1	Faulty Throttle sensor. Impermissible signal from the throttle sensor. The sensor voltage level is too high or
1101	1	Active	-001-1-1-1-1-1-1	Faulty Fixed Speed adjustment. Impermissible signal from the Fixed Speed Adjustment switch unit. The se
5100	6	Passive	-001-1-1-1-1-1-1	Communication error. Communication with the Engine Management System (EMS) interrupted. CAN-high .
5200	6	Active	-001-1-1-1-1-1-1	Communication error. The Engine Management System (EMS) uses a communication protocol version no

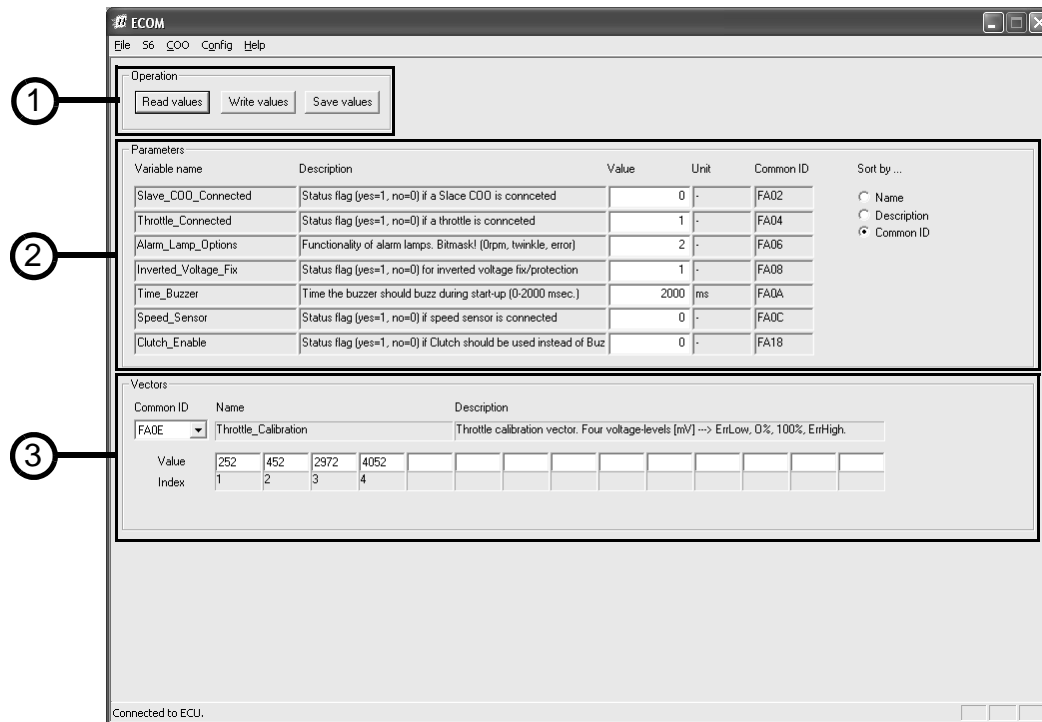
3.3 ECU Identification



This option displays the identification parameters from the coordinator.

1. Click the 'Read' button to load identification parameters from the coordinator. These contain, for example, information about the date of manufacture and part number.

3.4 Program EEPROM



The parameters and vectors in the coordinator which are available to the aftermarket can be reprogrammed here. A list of the parameters and vectors can be found on page 40.

1. By pressing the 'Read values' button, the parameters and vectors which can be amended in the coordinator are loaded. They are displayed in the 'Parameters' or 'Vectors' field (see points 2 or 3) below.

When you have finished making changes, click the 'Write values' button. ECOM then writes the new values to the coordinator. After completing the programming, an information box displays what has been programmed.

The 'Save values' button saves all the parameter and vector values to a text file.

- Parameters which can be changed on the aftermarket are displayed in the 'Parameters' field. They are described in columns as follows. Variable name (parameter name in the software), Description (description of the parameter in plain text), Value (current value), Unit (unit in which the parameter is measured), Common ID (hexadecimal ID number).

In the 'Sort by...' field on the right, it is possible to sort the parameters which are displayed in the 'Parameters' field in alphabetical order in three different ways. According to Common ID, parameter description or parameter name.

If you wish to change a value in the control unit, enter it in the Value column and then click the 'Write values' button (see point 1).

Parameters						Sort by ...	
Variable name	Description	Value	Unit	Common ID		<input type="radio"/> Name	<input type="radio"/> Description
Slave_C00_Connected	Status flag (yes=1, no=0) if a Slave C00 is connected	0	-	FA02		<input checked="" type="radio"/> Common ID	
Throttle_Connected	Status flag (yes=1, no=0) if a throttle is connected	1	-	FA04			
Alarm_Lamp_Options	Functionality of alarm lamps. Bitmask! (0rpm, twinkle, error)	2	-	FA06			
Inverted_Voltage_Fix	Status flag (yes=1, no=0) for inverted voltage fix/protection	1	-	FA08			
Time_Buzzer	Time the buzzer should buzz during start-up (0.2 sec.)	1	s	FA0A			
Speed_Sensor	Status flag (yes=1, no=0) if speed sensor is connected	0	-	FA0C			
Clutch_Enable	Status flag (yes=1, no=0) if Clutch should be used instead of Buz	0	-	FA18			

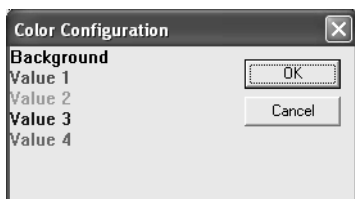
- Select Common ID in the list to display the current vector values in the 'Value' line. You can see the parts (bytes) which the Common ID consists of in the bottom 'Index' line. The 'Name' field describes the vector name in the software and the 'Description' field describes the vector in plain text.

You can change the values in the 'Value' line and then click the 'Write values' button (see point 1).

Vectors													
Common ID	Name				Description								
FA0E	Throttle_Calibration				Throttle calibration vector. Four voltage-levels [mV] --> ErrLow, 0%, 100%, ErrHigh.								
Value	252	452	2972	4052									
Index	1	2	3	4									

4. Config

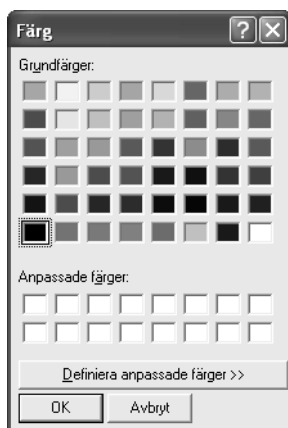
4.1 Colours



Within this function you can select which colours you wish to use when displaying measurable variables graphically (see page 11). The different colour options represent the following:

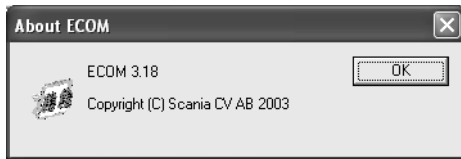
- Background = Background colour
- Value 1 = Curve 1
- Value 2 = Curve 2
- Value 3 = Curve 3
- Value 4 = Curve 4

Click the colour you wish to change to access a window with colour options.



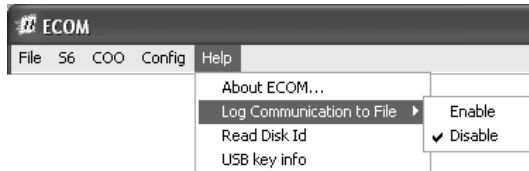
5. Help

5.1 About ECOM...



This option displays a window with information about which version of ECOM you are running.

5.2 Log Communication to File



This function logs everything that is carried out in ECOM while the program is active. When ECOM is closed, 3 text files (TransportLog.txt, DataLinkLog.txt, and ApplicationLog.txt) are saved in the same directory as the one in which the program is installed. The contents of the text files are rarely of use to the normal user, but if there are communications problems this function can be used to send the text files to a service engineer. The function is activated by selecting 'Enable' and deactivated by selecting 'Disable'.

5.3 Read Disk ID



A window is displayed with information about the user's hard disk identity.

5.4 USB key info



A window is displayed with information about the serial number, internal Scania number and rights for the USB key.

Usable measurement variables

A list is provided below of the measurable variables used most frequently when carrying out general measurements or troubleshooting. It is recommended that you save this as a predefined list in 2.2 Measurement, section E (see page 11).

Description	Variable name	Information
CAN, percent load at current speed transmitted on CAN	Cane_r_loadCurrSpeed_U08r	
Engine run time	Dcmn_ti_EngineRunTime_U32r	
Ecu run time, since power on	Dcmn_ti_CurrentEcuRunTime_U32r	Engine control unit
Boost pressure - filtered value	Eadc_p_boostfilt_S16r	
Oil pressure - filtered value	Eadc_p_oilfilt_S16r	
Boost temperature - filtered value	Eadc_t_boostfilt_S16r	
Engine temperature - filtered value	Eadc_t_engfilt_S16r	
Battery voltage (U30) - filtered value	Eadc_u_batNewfilt_S16r	Actual battery voltage
Battery voltage during cranking	Eadc_u_batStart_S16r	
Engine start signal from coordinator	Ecab_s_start_Br	0=No signal 1=Signal
Engine speed, average (1)	Eess_n_avg10ms_S16r	
Engine speed, if phase is checked or not	Eess_s_EpsPhaseLocked_S08r	0=Not synchronised 1=Synchronised
Nominal fuel quantity limitation	Flim_q_nominal_S16r	Shows nominal fuel for actual engine speed
Fuel quantity lim status of the logic	Flim_s_unit_Er	Indicates which torque reduction is active
Fuel quantity, corrected total	Fqsc_q_corr_S16r	Shows actual fuel
Fuel quantity logic, status	Fqsc_s_unit_Er	Indicates which regulator is in control
Fuel, instant fuel rate	Fuco_ux_fuelRate_U16r	Fuel consumption in l/h
Battery voltage (U30) - voltage level just before starter is activated	Stco_u_batBeforeStart_S16r	
Battery voltage (U30) - min. voltage level when starter is activated	Stco_u_batStartMin_S16r	

Examples

Two examples are provided below of troubleshooting that can be carried out if the engine performance is poor. Both are taken from actual cases.

Troubleshooting – internal synchronisation problem

On earlier engines with PDE injectors and EMS, sometimes the control unit cannot determine which cylinder it should inject fuel into. The engine therefore does not reach full power since the problem causes a torque reduction until the engine is synchronised.

To determine whether this may be the problem, ECOM is used to measure the variable 'Engine speed, if phase is checked or not' (Eess_s_EpsPhaseLocked_S08r). The variable displays the value 0 as long as the engine is not synchronised. When the engine is synchronised, the value 1 is displayed.

This problem has now been resolved and should therefore not occur on new engines.

Troubleshooting – regulator (applies only to DC16A)

If there are problems with the power on an engine, it can be useful to see which regulator determines the fuel quantity and how much fuel is used at present. Use the measurement variables below to check this.

Description	Variable name	Information
Fuel quantity, corrected total	Fqsc_q_corr_S16r	Actual fuel amount (mg/stroke)
Fuel quantity logic, status	Fqsc_s_unit_Er	Indicates which regulator is in control 1=Throttle control 3=PowerTakeOff control 5=Starting module 6=Low idle 11=Single speed governor 20=Fuel step limitation 22=Torque reduction (see next row) 23=High idle 30=Transmission control 40=Normal zero fuel 41=Zero fuel from alarm
Fuel quantity lim status of the logic	Flim_s_unit_Er	Indicates which torque reduction is active (Only valid if the value above is 22). 1=Normal torque limitation 5=Smoke limiter 7=Limitation from alarm 8=Limitation during double pulsing 20=Extra (lower) torque curve active 21=PowerTakeOff limitation 48=Ramping between limitations



Parameters

A table is provided below with the parameters which can be programmed within the function '2.5.1 Program E2 Parameters' on page 23.

¹⁾=The function is only available in software version 2242, ²⁾=The function is only available in software version 2253 or later. ³⁾=The function is only available in software version 2270 or later.

CID	Description	Limits	Typical value	Unit	Parameter name
General (all engines)					
FE17 ²⁾ FE21 ²⁾	Low idle ref engine speed Low idle ref engine speed controller. 0=use basic low idle adjustable with CC-buttons, 1=use FE17 not adjustable with CC-buttons	0 - 3200 0 - 1	650 0	[rpm] [-]	E2dh_n_rdLicoRef_S16r E2dh_s_rdLicoRefCtrl_Br
FE65 ²⁾	Oil temperature sensor on EMS available (=1) or not (=0)	0 - 1	0/1	[-]	E2dh_s_E2oilTenable_Br
FE63 ²⁾	Use the safety switch on accelerator pedal (=1) or not (=0)	0 - 1	1	[-]	E2dh_s_E2useSafetySwitch_Br
FE67 ²⁾	Diesel fuel density, used only for fuel rate calculation	0 - 2000	840	[g/litre]	E2dh_ux_E2fuelDensity_S16r
FCB0 ¹⁾	Low idle ref engine speed cold engine (< 50 °C)	450 - 1250	650	[rpm]	E2dh_n_E2licoCold_S16r
FCB4	Kickdown function enable (=1). Gives extra torque for a short period of time	0 - 1	0	[-]	E2dh_s_E2kidoEnable_Br
FCCF ³⁾	Auxiliary switch. Enables/disables the functions split fueling and double pulse at start. 0=Default, 2=Turn off double pulse at start, 8=Enables split fueling on low load, 10=Both functions described above is activated	0,2,8,10	0	[-]	E2dh_s_E2auxSwitch_U08r
FCDA ¹⁾	Low idle ref engine speed warm engine (> 50 °C)	450 - 1250	650	[rpm]	E2dh_n_E2licoBasic_S16r
FCE7	Number of alternators controlled by EMS	0-2	0	[-]	E2dh_s_noOfAlternator_U08r
FD19	Fan function enable (=1), if fan is controlled by EMS	0-1	0	[-]	E2dh_s_E2fan_Br
FD1D	Starter function enable (=1), if starter motor is controlled by EMS	0-1	1	[-]	E2dh_s_E2starter_Br
FD6B	If a coordinator is communicating with the EMS (=1) or not (=0)	0-1	1	[-]	E2dh_s_E2canEnable_U08r
FD7D ²⁾	Disable (=1) reduced high idle after start	0 - 1	0	[-]	E2dh_rdHicoDisableAtStart_Br



CID	Description	Limits	Typical value	Unit	Parameter name
Single speed engines only					
FCD1	Nominal speed if no demand or error on CAN	low -> high idle	1500/1800	[rpm]	E2dh_n_E2sscoRef_S16r
FCD3	Time delay to start ramp from idle to nominal speed	0 - 65535	0	[s]	E2dh_ti_E2sscoRampStartDelay_U16r
FCD5	Ramp from low idle to nominal speed	0 - 180000	500	[rpm/s]	E2dh_dn_E2sscoRamp_S16r
FD65	Nominal speed offset at 100% demand	-127 -> +127	120	[rpm]	E2dh_n_E2sscoMax_S08r
FD63	Nominal speed offset at 0% demand	-127 -> +127	-120	[rpm]	E2dh_n_E2sscoMin_S08r
FD67	Droop value for single speed governor	0 - 25	4	[%]	E2dh_r_E2sscoDroop_U08r
FD61	Load level where nominal speed value is defined	0 - 100	100	[%]	E2dh_r_E2sscoNomSpeedLoad_U08r
FCFD	Single speed governor parameter. 0=normal, 1=soft, 2=stiff, 3)10=use first set of parameters from the step response test, 3)11=use second set of parameters from the step response test	0,1,2,10,11	0	[-]	E2dh_s_E2sscoGovParam_Er
FE69 ²⁾	Overspeed protection, offset from nominal speed	0 - 100	20	[%]	E2dh_r_E2overSpeedOffsetSsco_U08r
FCB1 ²⁾	Limit the nominal speed value from FCD1 or CAN-message TSC proprietary	0 - 3200	2000	[rpm]	E2dh_n_E2hicoRefBasic_S16r
FD79 ¹⁾	High idle offset from nominal speed for single speed engines	0 - 100	20	[%]	E2dh_r_E2hicoNoffsetSsco_U08r
All speed engines only					
FC8D	RQ (=0) / RQV (=1) regulator	0 - 1	1	[-]	E2dh_rdRQVenableFlag
FCB1	High idle speed, basic	0 - 3200	23 - 2400	[rpm]	E2dh_n_E2hicoRefBasic_S16r
Alarm / Error reactions					
FD6F	Coolant level sensor. 0=not present, 1=from coordinator	0 - 1	0/1	[-]	E2dh_s_E2coolLevelEnable_U08r
FD6D	Reaction to low coolant level. 0=alarm only, 1=torque limitation, 2=stop, 6=stop with override option	0,1,2,6	-	[-]	E2dh_s_E2cmolCoolLevelReact_U08r
FCB7	Reaction due to low oil pressure. 0=alarm only, 1=torque limitation, 2=stop, 6=stop with override option	0,1,2,6	-	[-]	E2dh_s_E2cmolPoilReact_U08r



CID	Description	Limits	Typical value	Unit	Parameter name
FCB6	Reaction due to high engine temperature. 0=alarm only, 1=torque limitation on low limit, 2=stop on high limit, 3=torque limitation and stop, 6=stop with override option, 7=torque limitation and stop with override option	0,1,2,3,6,7	0/1/6	[-]	E2dh_s_E2cmolTengReact_U08r
FCAF	Engine temperature shut-off limit	0 - 150	105	[°C]	E2dh_t_E2tengShutOff_S16r
FCF3	Engine temperature torque limitation limit	0 - 150	95	[°C]	E2dh_t_E2tengTorqLim_S16r
FCB5	Reaction on CAN or accelerator pedal error. 0=no action (low idle), 1=increased low idle, 2=CAN shut-off, 3=CAN shut-off & increased low idle, 4=AUX_AN as redundant accelerator pedal, 8=Always use AUX_AN accelerator pedal	0,1,2,3,4,8	0/1	[-]	E2dh_s_E2limpHome_U08r
PTO mode 0-3					
FC81	PTO mode 0, max engine speed	0 - 3200	3000	[rpm]	E2dh_rdPtocRefMaxMode0
FC82	PTO mode 1, max engine speed	0 - 3200	3000	[rpm]	E2dh_rdPtocRefMaxMode1
FC83	PTO mode 3, max engine speed	0 - 3200	3000	[rpm]	E2dh_rdPtocRefMaxMode3
FC80	PTO mode 3, fixed engine speed	0 - 3200	1500	[rpm]	E2dh_rdAdjPtocRefMode3
FD09	PTO mode 0, max torque	0 - 5100	5100	[Nm]	E2dh_tq_rdE2ptocMaxMode0_U08r
FD0B	PTO mode 1, max torque	0 - 5100	5100	[Nm]	E2dh_tq_rdE2ptocMaxMode1_U08r
FD0D	PTO mode 2, max torque	0 - 5100	5100	[Nm]	E2dh_tq_rdE2ptocMaxMode2_U08r
FD0F	PTO mode 3, max torque	0 - 5100	5100	[Nm]	E2dh_tq_rdE2ptocMaxMode3_U08r
FCA1	PTO mode 1, accelerator pedal effective (0=active)	0 - 1	0	[-]	E2dh_rdDisableAccPedMode1_Br
PTO mode 4					
FD11	PTO mode 4, max torque	0 - 5100	5100	[Nm]	E2dh_tq_rdE2ptocMaxMode4_U08r
Miscellaneous					
FE15 ²⁾	Low idle to enable fuel adjustment. Droop function on low idle	0 - 1	0	[-]	E2dh_rdLicoEnableFuelAdj_Br

Parameters (Arrays)

A table is provided below with the parameters which can be programmed within the function '2.5.2 Program E2 Arrays' on page 25.

¹⁾=The function is only available in software version 2242, ²⁾=The function is only available in software version 2253 or later.

CID	Description	Limits	Typical value	Unit	Parameter name
All speed engines only					
FCE3	Accelerator pedal value converted to reference engine speed (RQV)	0 - 3200	array x 4	[rpm]	E2dh_rdE2drivPv2ref_v
FCF9	Accelerator pedal breakpoint for FCE3	0 - 100	array x 4	[%]	E2dh_rdE2drivPv2refAx_x
FCE5	Droop values for different accelerator pedal values (RQV)	0 - 8	array x 4	[rpm/mg/st]	E2dh_rdE2drivDroop_v
FCFB	Accelerator pedal breakpoint for FCE5	0 - 100	array x 4	[%]	E2dh_rdE2drivDroopAx_x
Alarm / Error reactions					
FD77	Voltage breakpoints for 0% and 100% for redundant accelerator pedal connected to input AUX_AN on EMS	100 - 4900	array x 2 485, 2693	[mV]	E2dh_u_E2eauxAccAx_x
User friction torque					
FD73	Engine speed dependent friction torque. Breakpoints in FLASH, 500, 1000, 1500, 2200 rpm	0 - 5100	array x 4	[Nm]	E2dh_tq_E2torqUserFric_v
FD75	Engine speed and temperature dependent friction torque. Breakpoints in FLASH, 500, 1000, 1500, 2200 rpm	0 - 5100	array x 4	[Nm]	E2dh_tq_E2torqUserFricT_v
FD71	Temperature breakpoints for 0% and 100% of fan friction torque (FD75)	0 - 150	array x 2	[°C]	E2dh_t_E2torqUserFricT_v
Torque limit					
FD13	Torque limit 2, extra torque curve for customer use. Breakpoints for software version 2253: 1000, 1100, 1200, 1400, 1600, 1800, 1900, 2000, 2100, 2200, 2300, 2400 rpm	0 - 5100	array x 12	[Nm]	E2dh_tq_rdE2flimTorqueLim2_v
FD15	Torque limit 3, extra torque curve for customer use. Breakpoints for software version 2253: 1000, 1100, 1200, 1400, 1600, 1800, 1900, 2000, 2100, 2200, 2300, 2400 rpm	0 - 5100	array x 12	[Nm]	E2dh_tq_rdE2flimTorqueLim3_v
FCC7 ¹⁾	Engine speed breakpoints for Torque Limit 2 (FD13)	0 - 3000	array x 12	[rpm]	E2dh_rdE2flimTorqueLim2Ax_x



CID	Description	Limits	Typical value	Unit	Parameter name
FCC9 ¹⁾	Engine speed breakpoints for Torque Limit 3 (FD15)	0 - 3000	array x 12	[rpm]	E2dh_rdE2flimTorqueLim3Ax_x



Parameters and vectors for the Coordinator

A table is provided below with the parameters and vectors which can be programmed within the function '3.4 Program EEPROM' on page 38.

CID	Description	Limits	Default value	Unit	Parameter name
Parameters					
FA02 ²⁾	Flag for Slave Coordinator (1=with / 0=without)	0 - 1		[-]	Slave_COO_Connected
FA04	Flag for throttle (1=with / 0=without)	0 - 1		[-]	Throttle_Connected
FA06	Option for alarm lamp behaviour. (0=None, 1=If alarms for oil pressure and generator charge should be displayed when the engine is not running, 2=If alarm lamps should twinkle until they are acknowledged, 3=1 + 2, 4=If alarm lamps should be lit for sensor error, 5=1 + 4, 6=2 + 4, 7=1 + 2 + 4)	0 - 7		[-]	Alarm_Lamp_Options
FA08	Software fix to prevent inverted voltage feed from Coordinator outputs to EMS U15 input (1=with / 0=without)	0 - 1	1	[-]	Inverted_Voltage_Fix
FA0A ⁴⁾	Governs the time which the buzzer should sound at system start-up. Needs a buzzer connected to COO pin 5	0 - 2000	1000	[ms]	Time_Buzzer
FA0C ³⁾	Governs fault code setting of the speed sensor (1=with / 0=without). Only usable if you have an extra speed sensor connected to COO pin 41	0 - 1	0	[-]	Speed_Sensor
FA18 ³⁾	Changes the functionality of COO pin 50, from BuzzerOff to ClutchPedal (1=with / 0=without). Only usable if you have connection to a clutch pedal in your application, otherwise used to turn off buzzer alarms (if buzzer is mounted)	0 - 1	0	[-]	Clutch_Enable
Vectors					
FA0E ¹⁾	Calibration vector for throttle control. Breakpoints Index: 1=Error Low, 2=0% Throttle, 3=100% Throttle, 4=Error High. Only needed to adjust if you have a non-Scania throttle control	100 - 4900	1=252, 2=452, 3=2972, 4=4052	[mV]	Throttle_Calibration



CID	Description	Limits	Default value	Unit	Parameter name
FA10	Calibration vector for engine oil pressure instrumentation. Breakpoints for oil pressure signal Index: 1 - 7 controls index 1 - 7 in Common ID FA12. Only needed to adjust if you are using a non-Scania instrumentation	0 - 10	1=0 2=1.0 3=2.0 4=4.0 5=6.0 6=8.0 7=10.0	[bar]	Oil_Gauge_Calibration_X
FA12	Calibration vector for engine oil pressure instrumentation. PWM duty cycle values for oil pressure depending on Common ID FA10 breakpoint values. Only needed to adjust if you are using a non-Scania instrumentation	0 - 100	1=10.0 2=23.8 3=31.3 4=43.1 5=50.3 6=54.5 7=59.4	[%]	Oil_Gauge_Calibration_Y
FA14	Calibration vector for engine temperature instrumentation. Breakpoints for engine temperature signal Index: 1 - 7 controls index 1 - 7 in Common ID FA12. Only needed to adjust if you are using a non-Scania instrumentation	-40 - +140	1=40 2=70 3=80 4=90 5=100 6=110 7=120	[°C]	Temp_Gauge_Calibration_X
FA16	Calibration vector for engine temperature instrumentation. PWM duty cycle values for engine temperature depending on Common ID FA14 breakpoint values. Only needed to adjust if you are using a non-Scania instrumentation	0 - 100	1=55.3 2=32.9 3=26.6 4=21.1 5=16.1 6=12.1 7=9.0	[%]	Temp_Gauge_Calibration_Y

¹⁾ Refer to page 52 for special conditions when programming the Common ID FA0E ²⁾ Only valid for software No. 1730480 ³⁾ Only valid for software No. 1730478 and 1730482 ⁴⁾ Only valid for software No. 1730478, 1730479, 1730480 and 1730481

Special conditions for Common ID FA0E

The table below describes the conditions which apply when programming the Common ID FA0E. If you enter values which do not meet these conditions, they will not be programmed into the coordinator, in order to protect the engine from damage.

Vector index No.	Vector value	Condition
0	a	$100 \text{ mV} \leq \mathbf{a}$
1	b	$\mathbf{a} + 100 \text{ mV} \leq \mathbf{b} \leq \mathbf{c} - 1000 \text{ mV}$
2	c	$2000 \text{ mV} \leq \mathbf{c} \leq \mathbf{d} - 100 \text{ mV}$
3	d	$\mathbf{d} \leq 4900 \text{ mV}$



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